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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/528,381

06/01/2005

Frank K. Crundwell

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DARBY & DARBY P.C.
P. O. BOX 5257
NEW YORK, NY 10150-5257

EXAMINER

SCHUBERG, LAURA J

ART UNIT

PAPER NUMBER

1657

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

01/30/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/528,381

Applicant(s)

CRUNDWELL ET AL.

Examiner

Laura Schuberg

Art Unit

1657

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☒ Claim(s) 16 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 5/18/06 6/30/06 7/24/06.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Objections

Claim 16 is objected to because of the following informalities: It appears that the word "one" has been left out of line 1. The claim is interpreted as the gas is enriched with **one** or more of a nutrient aerosol or ammonia. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 4-6, 10-12, 16-18 are rejected under 35 U.S.C. 102(e) as being anticipated by Du Plessis (WO 03/068999 A1).

The claims are drawn to a method of introducing microorganisms into a heap for bio-assisted heap leaching comprising: a) preparing microorganisms without exopolymers on their external cell walls; b) adding these microorganisms to a heap; c) assisted or un-assisted re-activation of the production of exopolymers. Dependent claims include limitations drawn to the conditions of the heap, nutrients and preparation of the microorganisms.

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Du Plessis teaches a method of heap leaching wherein a gaseous suspension which contains a microbial inoculum or nutrients is introduced into the heap (abstract). Ultra-micro bacteria (UMB), which are taught as preferred for the inoculum (page 4 line 21), are microbes which have been cultured in a manner which removes their polysaccharide envelopes and results in a reduction in size of the cells (page 5 lines 1-2). The polysaccharide envelopes are interpreted to be exopolymers on the external cell walls of the microbes. The UMB are dormant after starvation, but can be resuscitated with nutrient stimulation (page 5 lines 9-13) (claims 1, 2, 11). The microorganisms are added to the heap in a humid air stream that is also taught to contain nutrients (page 3 line 15-page 4 line 3). This is interpreted as an irrigation (pressurized or drip) and aeration of the heap since it includes droplets of liquid in a stream of air (claims 4, 5, 6, 12). The nutrients used are taught to include phosphates, ammonia, and potassium (page 2 lines 21-22) (claims 10 and 16). Since the gas used to aerate the heap is air, which contains carbon dioxide and is interpreted as a natural gas, the method also inherently includes un-assisted re-activation as well (claims 17 and 18).

Therefore, the teaching of Du Plessis anticipates Applicant's invention as claimed.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Du Plessis (WO 03/068999 A1) as applied to claims 1, 2, 4-6, 10-12, 16-18 above, and further in view of Lappin-Scott et al (Applied and Environmental Microbiology 1988).

Claim 3 includes wherein the microorganisms are starved by limiting carbon.

Du Plessis teaches a method of heap leaching as described above, but the bioleaching process is not explained in detail since it is generally known in the art (page 6 lines 2-3). Du Plessis refers to a Lappin-Scott reference for the steps that apply to the starvation of the bacterial cells used in the method (page 5 lines 9-13).

Du Plessis does not specifically teach wherein the microorganisms are starved by limiting carbon.

Lappin-Scott teaches a method of preparing microorganisms that are reduced in size by carbon deprivation (page 1373 column 1, 2nd paragraph).

Therefore, it would have been obvious to starve the microorganisms by limiting carbon in the method of Du Plessis because Du Plessis teaches that the Lappin-Scott

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reference provides suitable information in producing the small starved cells necessary for the method. One of ordinary skill in the art would have been motivated and had a reasonable expectation of success because Lapin-Scott teaches that carbon deprivation produces bacteria that are reduced in size.

Therefore, the combined teachings of Du Plessis and Lappin-Scott render obvious Applicant's invention as claimed.

Claims 7-9, 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Du Plessis (WO 03/068999 A1) as applied to claims 1, 2, 4-6, 10-12, 16-18 above, and further in view of Harrington (US 6,435,769 B2).

Claims 7 and 13 include the step of imbedding a carbon source in the heap.

Claims 8 and 14 include wherein the carbon source comprises carbonate.

Claims 9 and 15 include wherein the solid nutrients of step a) comprises slow release nutrients.

Du Plessis teaches a method of heap leaching as described above, but the bioleaching process is not explained in detail since it is generally known in the art (page 6 lines 2-3). Du Plessis teaches that nutrients that are known in the art as being desirable for promoting microbial activity within a heap leaching process are suitable for the method taught (page 2 line 21- page 3 line 2).

Du Plessis does not specifically teach the step of imbedding a carbon source in the heap, wherein the carbon source is carbonate, or wherein the solid nutrients comprise slow release nutrients.

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Harrington teaches a process for treating earth materials such as rock heaps and that there are several options for supplying nutrients to a heap. Microbiological nutrients may be added before, after or during a rock heap is being formed and that a slow release component is suitable as well (column 6 lines 16-50). Harrington also teaches that the addition of carbonate to a rock heap is beneficial as well (column 9 line 45).

Therefore, one of ordinary skill in the art would have been motivated to use the carbonate as a carbon source as well as a slow release nutrient form for the method of Du Plessis because Harrington teaches that these are known in the art to be beneficial for leaching of rock heaps. One of ordinary skill in the art would have had a reasonable expectation of success because Du Plessis teaches that nutrients that are known in the art as being desirable for promoting microbial activity within a heap leaching process are suitable for the method taught (page 2 line 21- page 3 line 2).

Therefore, the combined teachings of Du Plessis and Harrington render obvious Applicant's invention as claimed.

Conclusion

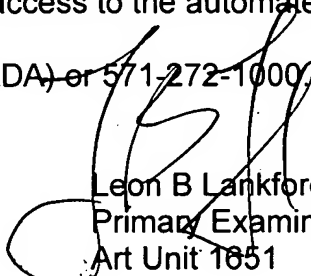
No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura Schuberg whose telephone number is 571-272-3347. The examiner can normally be reached on Mon-Fri 8:00-4:30.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jon Weber can be reached on 571-272-0925. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Leon B Lankford, Jr
Primary Examiner
Art Unit 1651

Laura Schuberg